

REMARKS

Applicant wishes to thank the Examiner for the attention accorded to the instant application.

Claims 1-14 and 32 remain pending in the application

DRAWINGS

The Examiner has objected to the drawings as failing to comply with 37 CFR 1.84(g), 37 CFR 1.84(h), 37 CFR 1.84(j) and 37 CFR 1.84(p).

Applicants have amended the drawings to comply with all requirements set out above.

I. **Claim Rejections Under 35 U.S.C. § 102(b)**

Claims 1-4, 7-13 and 32 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Sutherland et al. United States Patent 5,942,157 “(Sutherland I)”. Applicants respectfully traverse this rejection based on the original claims. Additionally, the present amendments further distinguishing.

To anticipate a claim under 35 U.S.C. § 102, a single source must contain all of the elements of the claim. *Lewmar Marine Inc. v. Barient, Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 1007 (1988).

However, in the present case, it cannot be said that the device disclosed in Sutherland I having electrically controllable, variable grating would anticipate claims 1 and 32.

The Examiner rejected claims 1 and 32 using Sutherland I as follows:

Sutherland I, discloses a device having electrically controllable, variable reflection gratings having a composition comprising a periodic array of liquid crystal disposed in a polymer matrix (PDLC), the liquid crystal having an index of refraction that is variable in response to an applied electric field, wherein the index of refraction of the liquid crystal array and the index of refraction of the polymer matrix, n_p are mismatched at first and second applied electric field strength. Sutherland I, discloses the application of external electric field across the ITO electrodes for applying the electric fields and a means for the application of the electric field. *Office Action dated November 16, 2003 page 2-3.*

It is respectfully submitted that Sutherland does not support a rejection under § 102(b), which requires that “each element of the claim at issue be found, either expressly described or under principles of inherency, in a single prior art reference.” *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 771, 218 USPQ 781, 789 (Fed. Cir. 1983).

Sutherland I teaches a switchable volume hologram material and device. Further Sutherland I teaches that the volume hologram discloses that the net birefringence of a subwavelength grating will be at a minimum when n_{PDLC} is equal to n_p . Such a relationship is established when the refractive index of the polymer plane equals the refractive index of the liquid crystal, consequently the index refraction of the polymer plane and liquid crystal are matched.

Conversely, in the present invention, as recited in independent claims 1 and 32 which includes the limitation of “an index of refraction of the liquid crystal and the index

of refraction of the polymer matrix”, being “mismatched at the first and second applied electric field strengths”. Furthermore, Sutherland I does not disclose the pair of electrodes which are positioned to apply electrically fields across the composition.

As to independent claim 32 Sutherland I does not disclose the limitation of a “means for applying an electric field across the device to provide first and second applied electric fields strengths” wherein the index of refraction of the liquid crystal and the index of refraction of the polymer matrix, n_p are mismatched at said first and second applied electric field strengths as aforementioned.

Therefore, the rejection under 35 U.S.C § 102(b) should be removed and claims 1 and 32 should be allowed. Based upon the forgoing there can be no anticipation by Sutherland I, thus the rejections should be removed. Further as to claims 2-4 and 7-13, by their dependency on independent claim 1, are similarly allowable.

II. Claim Rejections Under 35 U.S.C. § 103

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the

prior art, and not based on applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Furthermore, the U.S. Court of Appeals for the Federal Circuit restated the legal test applicable to rejections under 35 U.S.C. § 103(a) (*In re Rouffet*, 47 USPQ2d 1453 (Fed. Cir., July 15, 1998)). The Court stated:

[V]irtually all [inventions] are combinations of old elements. Therefore an Examiner may often find every element of a claimed invention in the prior art. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an Examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the Examiner to show a motivation to combine the references that create the case of obviousness. The Board [of Appeals] did not, however, explain what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination. Instead, the Board merely invoked the high level of skill in the field of the art. If such a rote indication could suffice to supply a motivation to combine, the more sophisticated scientific fields would rarely, if ever, experience a patentable technical advance. Instead, in complex scientific fields, the Board could routinely identify the prior art elements in an application, invoke the lofty level of skill, and rest its case for rejection. To counter this potential weakness in the obviousness construct the suggestion to combine requirements stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness. *In re Rouffet*, 47 USPQ2d 1457-58 (Fed. Cir., July 15, 1998) (citations omitted).

The Examiner has rejected claims 5 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Sutherland I in view Sutherland et al. “(Sutherland II)” (Applied Physics Letters 64 (9) 28 February 1994). The Examiner further rejects claim 14 under 35 U.S.C. § 103(a) as being unpatentable over Sutherland I in view Catchpole et al. “(Catchpole)” (U.S. Patent No. 5,644, 330).

As to claims 5-6, the Examiner states that Sutherland I, discloses an effective refractive index of the liquid crystal ($n_{\text{sub LC}}$) and a refractive index for the polymer ($n_{\text{sub p}}$). However, the Examiner asserts that Sutherland I, does not explicitly state that the liquid crystal has an ordinary ($n_{\text{sub 0}}$) and an extraordinary ($n_{\text{sub e}}$) refractive indices and that the ($n_{\text{sub 0}}$ is not equal to $n_{\text{sub p}}$) and does not disclose that the indices are related by ($n_{\text{sub e}} > n_{\text{sub p}} > n_{\text{sub 0}}$). However the Examiner asserts that Sutherland II, on the other hand, in disclosing electrically switchable volume gratings in polymer-dispersed liquid crystals, discloses that the liquid crystal having an ordinary ($n_{\text{sub 0}} = 1.518$) and an extraordinary ($n_{\text{sub e}} = 1.738$) indices of refraction and the refractive index of the polymer ($n_{\text{sub p}} = 1.517$). Therefore, the Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the specific indices of refraction for the liquid crystal and the polymer satisfying the indicated relationships to achieve devices with high diffraction efficiencies, as well as narrow band wavelength and angle selectivity.

As to claim 14 the Examiner states that Sutherland discloses that the electrode comprises a conductive layer made out of ITO. The Examiner states that Sutherland I, however, does not disclose that the electrode is a metallic electrode. Catchpole, in

disclosing a driving method for polymer stabilized liquid crystal displays, discloses that the electrode layer may be a thin layer of metal such as silver, copper, titanium and molybdenum, including a thin layer of transparent conductive material such as Indium tin oxide. Therefore, the Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the thin layer of metal in place of Indium Tin Oxide, as long as the metal layer is transparent for low energy consumption devices and for effective addressing of large, color displays.

Applicant respectfully submits that claims 5-6 and 14 are allowable over the various references cited in view of Sutherland I. Claims 5-6 and 14 all depend from independent claim 1 of the present invention, which includes the limitation of an “index of refraction of the liquid crystal and the index of refraction of the polymer matrix”, being “mismatched at the first and second applied electric field strengths”. As aforementioned Sutherland I does not disclose the limitation of the mismatched index of refraction of the liquid crystal and index of refraction of the polymer matrix. In fact, Sutherland I teaches away from the limitation, “[t]herefore, if the refractive index of the PDLC plane can be matched to the refractive index of the polymer plane, by the application of an electric field, the birefringence of the subwavelength grating can be switched off.” (col. 17, lines 36-38).

Since Sutherland I clearly teaches away from the concept of index of refraction mismatching, any combination of Sutherland I with any of the cited references would be impermissible. A person of ordinary skill in the art at the time the invention was made,


would not have had the motivation or suggestion to combine Sutherland I with any of the other recited references to feature all of the limitations of the present invention.

Based on the forgoing and since Sutherland I does not teach or suggest all the claim limitations, either alone or in combination with other references, a prima facie case of obviousness has not been set forth. Applicant, therefore, respectfully submit that claims 1 and 32 are allowable over the cited references. Claims 5-6 and 14, by their dependency on claim 1 are similarly allowable.

III. Conclusion

For the forgoing reasons, Applicants respectfully submit that claims 1-14 and 32 are now in condition for allowance. Early notice to that effect is earnestly solicited.

Respectfully submitted,

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